11. Sanjay

Program Name: Sanjay.java **Input File: sanjay.dat**

During his fishing trip, Sanjay was hit by a rogue wave! In the commotion he was able to keep hold of his fishing pole and ocean map, but unfortunately lost his paddle. Due to this, he is at the mercy of the ocean currents, but has come up with a plan. Sanjay would like to use his map to determine the closest his boat will drift to an island. From there he can hook onto the island with his fishing pole and reel himself in to subsist on bananas and coconuts until he is eventually rescued.

Given the direction that the boat is drifting, and a description of all the islands (given as polygons on the y = 0 ocean plane), write a program to find the closest island to the path of Sanjay's boat.

Input: The first line of input will contain a single integer `T`, the number of test cases to follow (`1` <= `T` <= `10`). The first line of each test case will contain an integer `N` denoting the number of islands on the map , followed by 4 floating point numbers `x`, `z`, `dx`, and `dz`, denoting the x and z position, and the x and z velocity of Sanjay's boat on the ocean plane. Sanjay's boat is very small compared to the islands and can be viewed as a point on the plane. The following `N` lines of each test case will each contain a single island description. Each island description will begin with an integer `V`, the number of vertices in the island's polygon, followed by `2*V` space separated floating point numbers representing the position of the island in the order $x_0,z_0,x_1,z_1, \ldots, x_V,z_V$. These points will form a polygon and be given in clockwise order.

Constraints:
There will be at most `10` test cases
There will be at most `50` islands per test case
no island will consist of more than `50` vertices
No X or Z coordinate of a boat or island point will have an absolute value greater than 10,000.
`-100` <= `dx`, `dz` <= `100`
Sanjay will not start on an island

Output: For each test case on its own line, output the minimum distance Sanjay's boat will be from any island, rounded to 3 places after the decimal point. This distance is calculated by the length of the shortest line whose endpoints are incident to both Sanjay's boat and some island during the course of the boat's drift.

Sample input:
```
2
3 -3.0 -1.0 1.0 1.0
5 -8.0 -7.0 -7.0 -7.0 -7.0 -9.0 -8.0 -9.0 -9.0 -8.0
5 -1.0 -3.0 3.0 0.0 4.0 -2.0 3.0 -5.0 1.0 -5.0
5 7.0 4.0 6.0 6.0 8.0 7.0 9.0 7.0 10.0 4.0
2 -3 -1 1 1
4 -4.0 8.0 -2.0 8.0 -2.0 6.0 -4.0 6.0
4 6.0 13.0 7.0 13.0 9.0 11.0 6.0 12.0
```

Sample output:
```
1.414
0.000
```